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"Clay Pit, You Are the Creator of God and Man!": Textual Evidence for the Sources of Raw Clay Used in Mesopotamia

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The extraction of raw clay for the manufacture of mudbricks, pottery, tablets and figurines is rarely described in the cuneiform record. Nevertheless, an examination of the sources reveals that the people of ancient Mesopotamia selected the raw material according to their needs from 'clay pits' (clay deposits) or other locations. Ritual texts in particular identify the origin of the clay used for the creation of magical figurines. When an exorcist was instructed to take clay from a clay pit, he first had to ritually appease and compensate the pit for its subsequent exploitation. The origin of clay for mudbricks and tablets is given in specific instances; that of potter's clay can only be deduced from archaeological and anthropological observations.

Keywords: clay sources, clay pits, clay tablets, clay figurines, Mesopotamia

It is our honour to dedicate this article to the memory of His Imperial Highness Prince Mikasa for his devotion to the field of Ancient Near Eastern studies. We would like to express our gratitude for his unceasing support to scholars and students.

1. Introduction

In ancient Mesopotamia, clay was the most familiar natural resource, abundantly and easily available in the vast alluvial plains through which the Tigris and Euphrates flow. The people used this clay as the raw material for various necessities of life, such as mudbricks, pottery, figurines and clay tablets. Inscribed with cuneiform signs, clay tablets record a variety of information, ranging from economic and administrative issues to historical accounts, letters, and literary texts, including myths, rituals, religious, mathematical, and astronomical texts. Since cuneiform scripts were deciphered in the mid-nineteenth century, there have been extensive studies of what is written on these tablets. However, the material aspects of clay tablets have not been the focus of much research until recently, outside of a few pioneering investigations (Thickett 1998; Thickett 1999; Thickett and Odlyha 1999; Goren et al. 2004; and Goren et al. 2011; Cartwright and Taylor 2011; Uchida and Watanabe 2014; and Uchida et al. 2015). Since 2008 an international team led by C. E. Watanabe, comprising geologists, microbiologists, archaeologists and Assyriologists, has been endeavouring to investigate clay tablets from the point of view of the raw material, in order to examine their physical and chemical characteristics in relation to the geographical locations of their original manufacturing sites (Watanabe 2011; Sterba et al. 2011; Uchida et al. 2011; Tuji et al. 2011; and Tuji et al. 2014). In the course of our examinations, we realised that there are many

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fundamental issues which have not been properly investigated nor clarified, such as where did the ancient Mesopotamians collect the clay they used to make tablets? How was the clay paste prepared? Was the clay mixed or tempered? What inclusions can we find in the tablets' composition? Relevant studies are based on assumptions rather than on actual evidence. The present study aims to explore the various clay sources the Mesopotamians used to manufacture clay tablets, pottery, mudbricks, figurines, and plaques. We approach this issue from a textual point of view, supplemented with archaeological evidence, thus providing a framework upon which further scientific studies can build.

2. Background and terminologies

Soil is divided into three categories according to particle size: sand, silt, and clay. *Sand* particles are larger than 0.05 mm in diameter, *silt* particles have diameters between 0.002 mm and 0.05 mm, and *clay* particles are the smallest with diameters of less than 0.002 mm. The soils (Sumerian **saḫar**, Akkadian *eperu*) in the Mesopotamian Plain, the plain of the Tigris and Euphrates rivers comprising Babylonia and Assyria (Buringh 1960, 115), are predominantly deep and silty clay loam soils "with large soil and moisture differences from place to place" (Dregne 1976, 84). The base material used to form clay tablets is best described as silt rather than clay in terms of grain size (Thicket and Odlyha 1999, 812).[1] Technically, therefore, it cannot be called clay according to the definition in soil science. However, the term *clay* is also used generally to describe soil with viscosity; we refer to clay with this broader definition in this study. Sumerian **im** = Akkadian *ṭīdu*/*ṭiṭṭu* designates the plastic clay used creatively by divine beings and humans.

The *clay source* defines the place where the raw clay was collected. In a petrographic study of ceramic raw materials, two types of clay sources are distinguished: (1) primary or 'residual' clay deposits, and (2) secondary or 'sedimentary' clay deposits. Quinn (2013, 117–150) stresses the importance of distinguishing these two types of deposits in order to identify ancient raw material sources used for ceramics:

> Primary or 'residual' clay forms by the chemical weathering of alumina-rich silicate minerals such as feldspars and micas in wet environments, or the hydrothermal alteration of specific rock types. Residual clay forms in situ and tends to exist as relatively small, often discontinuous deposits lying on or close to the parent rock that has been weathered, though some hydrothermal deposits of clay can be very extensive. Soil and regolith layers are often residual in origin. Secondary or 'sedimentary' clay sources form by the erosion, transportation and deposition of clay-rich material, usually by water. They accumulate some distance from their source and may not therefore bear any mineralogical relationship to the underlying bedrock. Secondary clay tends to occur as thicker, more laterally extensive deposits, which represent some of the largest clay sources on the Earth's surface (Quinn 2013, 120).

[1] Cf. Thickett 1998, 6. Sallaberger (2014–16b, 90) suggests using the word 'loam' instead of 'clay,' but 'loam' is a term mostly used in soil physics for agricultural contexts to describe a type of soil that is not predominantly sand, silt, or clay but a mixture with a mineral composition of approximately 40 : 40 : 20 % concentration of sand : silt : clay, respectively. Loam soils generally contain more nutrients, moisture, and decayed plants than sandy soils, and are good for growing crops and plants. It is also used for the construction of houses (Kaufmann and Cleveland 2007, 318–319).

Both types of clay deposit are often exposed at the surface of the earth, and potters collect clay from such clay sources. The general characteristics of these two types of clay deposits are summarised by Quinn (2013, 120–122). The primary clay sources, i.e., residual clay deposits, tend to be coarse textured and contain angular, poorly sorted silt-and-sand-sized grains; their mineral and rock clasts can be attributed to a single type of parent rock on which they formed. The coarse nature of these deposits gives them low plasticity. These residual clay deposits often contain a high proportion of iron and low organic content, and they are often heterogeneous and layered.[2] The secondary clay sources, i.e., sedimentary clay deposits, consist of finer grains which are more evenly sorted and rounded due to the action of aqueous transportation. They contain clasts from a wider range of parent rocks than residual clay. The degree of roundness and angularity of the clasts is related to the type of parent rock from which they came and the distance that they have been transported from their source. With increasing distance from their source, minerals such as quartz, feldspar and micas become more abundant. Sedimentary clay is more homogeneous with fewer impurities, and the fine nature of marine and lacustrine clay deposits gives them high plasticity.[3] When the clay from residual clay deposits is refined by the methods of cleaning, sieving and levigation[4] to produce well-sorted fine clay, the distinction between residual and sedimentary clays can become difficult.

Raw clay can be obtained in several ways, most commonly by *surface collection* or *pit extraction*. In his discussion of the clay extracting techniques used by African potters, Gosselain describes these two processes as follows:

> In surface collection, the raw material is extracted on, or just below the surface, either on the ground (plain, fields, dried ponds, or riverbeds), a hill, or the wall of a slope or an embankment. After having eliminated the superficial organic and mineral layer, the potter extracts clay without really digging underground. The operation may be described as "peeling" a clay bed. Pit extraction consists of digging the ground vertically or diagonally until an appropriate layer is reached. Most pits are some 1 or 2 m deep and 2 or 3 m in diameter. … Variations are observed in the way potters exploit and manage these structures. For instance, some use them until the clay layer is completely exhausted, while others abandon the pit until a specific depth is reached, or as soon as it shows risks of collapsing (Gosselain 2008, 33).

What does this mean for the situation in Mesopotamia? The Mesopotamian floodplain was formed mainly by Holocene sediments of the Tigris and Euphrates rivers. The alluvial plain has provided people with the inexhaustible natural resource of sedimentary deposits. These deposits may be divided into two categories: (1) those freshly formed and contemporaneous with the people who used them, and (2) the secondary or sedimentary deposits discussed above, which were formed much earlier, and where the clay could have been ancient. People expected seasonal floods at least twice a year in Mesopotamia: one in late spring and the other in late autumn. The spring flood was caused by the melted snow in the upper stream in the mountains, and the autumn flood

[2] A residual clay source is often formed close to the Earth's surface, if not exposed; see Quinn 2013, 121 fig. 5.3.
[3] See Quinn 2013, 121 fig. 5.4.
[4] Levigation is the process of separating fine and coarse particles by suspending them in a liquid.

occurred following the seasonal rain which enabled the Mesopotamians to resume a new agricultural cycle with ploughing and sowing. This beneficial autumn flood was called 'carp-flood'[5] by the Sumerians. Once the flood water receded, it left finely sorted sediments on the surface which provided the Mesopotamians with fresh clay that could be collected from the floodplain and river banks. The secondary or sedimentary clay deposits created by the fluvial activity, however, were not formed contemporaneously with the people who made use of them, but were formed much earlier. Both the Tigris and the Euphrates changed their courses repeatedly over time, and the clay deposits formed by this mechanism cover extensive areas in southern Mesopotamia, some of which could have served as clay deposits or 'clay pits' where brickmakers, potters and scribes gained their source material.

Mesopotamian civilisation was literally built with clay; without the abundant availability of good clay all over the region, the history of Mesopotamia would have been rather different, as most of the buildings and temples were constructed of mudbrick. Hence, big extraction pits were needed to provide the raw clay needed to make bricks. The ancients described these clay sources, inter alia, as *eššû* and *kullatu*, traditionally rendered as "clay pit" in English (i.e., clay deposits; "Lehmgrube" or "Tongrube" in German). If the clay was dug out repeatedly from the same spot, the level of mining would have naturally gone lower, creating a large pit. The cuneiform texts reveal that both pit extraction and surface collection were used to acquire clay in Mesopotamia. In the *Epic of Gilgamesh*, one *šar* of Uruk is said to have been clay pit (*essû*), amounting to no less than 28.5 % of the city's surface (George 2003, 538–539 and 724–725, I: 22 and XI: 327, respectively). The clay pits "symbolize man's creativity as builder and craftsman" (George 2003, 527), their size suggesting "that large areas of southern cities or their outskirts were perforated by pits dug for the extraction of mudbrick. Because such pits would rapidly silt up with water-laid or aeolian sediments or garbage, it is hardly surprising that they are not evident today" (Wilkinson 2003, 91). Hence, *essû* is equated "with Sumerian words for pond or cistern (**pú**, **túl**), associated with *būrtu*, itself a pit more often than not full of water" (George 2003, 782). Wilkinson and Tucker describe these mudbrick extraction pits as follows:

> In terms of economy of effort during mud brick manufacture, it would be most efficient to locate both water and soil sources at the same place. In other words, soil would be excavated in the vicinity of a traditional water-hole, thus cutting back the edges and transforming it from a simple inverted cone into an irregular depression with a scalloped perimeter resulting from progressive recutting. Conversely, the operation of digging soil for mud brick could be engineered to reach the water-table or to create a depression suitable for the collection of winter runoff. By conducting both activities at the same place, a large depression, combined with a water source would result. … At sites on wadis, soil extraction for mud brick would have occurred close to the wadi where the depressions would have blended in with the form of the wadi (Wilkinson and Tucker 1995, 34).

These mudbrick extraction pits are, however, not the only place where clay was obtained in

[5] Cf. *Enki and the World Order*: 89; *Nanna-Suen's Journey to Nibru*: 331 and 340; *Ninurta's Exploits*: 347; *Ninurta and the Turtle*: 25. Note: references to these literary texts follow the description of ETCSL.

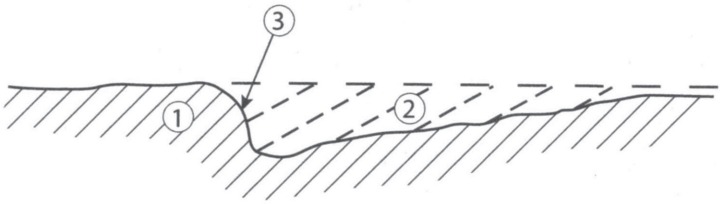

Fig. 1: Sketch of a mudbrick extraction pit (after Wilkinson 2003, 46 fig. k): ① Soil; ② Infill deposits; ③ Cut face (note asymmetrical profile). From Archaeological Landscapes of the Near East by T. J. Wilkinson © 2003 The Arizona Board of Regents. Reprinted by permission of the University of Arizona Press

Mesopotamia. As we will see below, clay from a canal may be needed to produce a special plaster; and ritual texts may call for clay from (one of) the river banks, a city ditch or a riverine meadow for the creation of magical figurines.

Microscopic observation of tablets from Umma in southern Iraq revealed that the clay was composed of naturally sorted particles of soil with many fragments of chert.[6] The presence of chert indicates that the soil was the result of natural sedimentation. Tablet clay also contains various inclusions, such as shells, stones and plant remains. Taylor and Cartwright (2011, 298–300, 318) examined these inclusions in the matrix of tablets and concluded that the raw material required minimal preparation, suggesting that levigation was not always considered necessary, and in some cases may even have been counterproductive. One can occasionally find a large shell inside a tablet, for example a Neo-Babylonian economic tablet housed in the Yale Babylonian Collection (NCBT 960) contains a nearly perfect specimen of a gastropod mollusc (i.e., land/water snail) (fig. 2). The presence of such inclusions suggests that the clay was probably not carefully prepared in advance but was used almost in its raw state in these instances. The presence of the snail suggests that the clay originated in a place near a stream, river or irrigation canal, as these are the creature's preferred habitat (Reade 2017, 169).

3. The cuneiform sources

Even though archaeologists discovered a vast number of tablets in the land of the Twin Rivers, informing us about many aspects of Mesopotamian civilisation, the cuneiform sources are not particularly informative about the origins of the raw clay used for the manufacture of objects. As the raw material is omnipresent in Mesopotamia, and good quality clay is readily available for potters, brickmakers, and other professionals, this may come as no surprise. Obtaining clay is such a basic activity that it need not be dwelt upon in writing. The few Mesopotamian textual references allude to both pit extraction and surface collection.

[6] A.Tuji and C. E. Watanabe, "DIATOMS found on clay tablets from Mesopotamia in the Yale Babylonian Collection and the British Museum," paper presented at 55th Rencontre Assyriologique Internationale (Paris, 2011); cf. Watanabe 2011, 388.

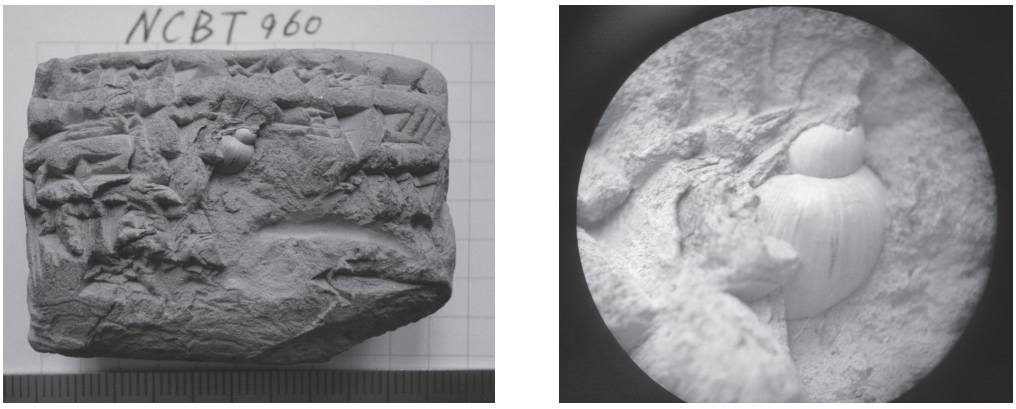

Fig. 2: (a) Economic tablet (NCBT 960) (left); (b) A shell inside tablet NCBT 960 (right). Courtesy of the Yale Babylonian Collection (photograph taken by Akihiro Tuji)

3.1. Clay and the divine world

In Mesopotamian myths, clay was a preferred raw material for the gods and goddesses when making living creatures. The god Enki/Ea, the god of wisdom, magic and incantations, and the goddesses Namma and Ninmah created humankind out of clay. The episode appears in the myth *Enki and Ninmah*, in which the mother goddess Namma mixes divine blood with clay to create man:

> After Enki had in wisdom reflected upon his own blood and body,
> He addressed his mother Namma,
> "My mother, there is my blood which you set aside(?), impose on it the corvée (labour) of the gods.
> When you have mixed it in the clay from above the Apsû,
> The birth goddesses will remove[7] a chunk of clay and you must fashion bodies.
> (Lambert 2013, 336–337, Section I: 28–32)[8]

Ninmah then took some clay from above the Apsû in her hand (Lambert 2013, 338–339, Section II: 21; Lambert 2000, 75) and fashioned various human beings, whose destinies Enki decreed. A Sumerian incantation alludes to this myth when Asalluhi says to Enki:

> When you have taken clay from the Apsû, the 'womb of mankind' (**im abzu-ta ağarin$_4$ nam-lú-u$_{18}$-lu-ke$_4$**) at the river bank (Schramm 2008, 68–69, no. 12: 12).

Humankind is created by mixing clay with the flesh and blood of a slaughtered deity in the Akkadian myth *Atra-hasīs*:

> Let one god be slaughtered
> So that all the gods may be cleansed in a dipping.
> From his flesh and blood

[7] For the translation of the Sumerian **kìr-kìr** = Akkadian *karāṣu*, originally translated by Lambert as "to nip off," we regard "to remove a chunk (of clay)" more appropriate (following George 2010, 275–276; see also Barrelet 1968, 34–35 and Sallaberger 1996, 8–9).

[8] See also Lambert 1992; Barrelet 1968, 7–11; Sallaberger 1996, 7 fn. 25.

> Let Nintu mix clay,
> That god and man
> May be thoroughly mixed in the clay,
> So that we may hear the drum for the rest of time
> Let there be a spirit from the god's flesh.
> (Lambert and Millard 1969, 58–59, I: 208–215)

In the Akkadian *Epic of Gilgamesh*, the mother goddess Aruru created the hero's friend, Enkidu, with clay from the steppe:

> Aruru washed her hands,
> She removed a chunk of clay,[9] she threw it down in the wild.
> In the wild she created Enkidu, the hero,
> An offspring of silence, knit strong by Ninurta (*kiṣir Ninurta*, lit. "chunk of Ninurta").
> (George 2003, 544–545, I: 101–104 [Neo-Assyrian version])

When humans die, they were believed to turn back to clay. In the *Epic of Gilgamesh*, a violent storm caused the Deluge which destroyed all of humankind except for Utnapishtim's family. The devastating result is described as people turning to clay:[10]

> The tempest grew still, the Deluge ended.
> I looked at the weather, and there was quiet,
> but all the people had turned to clay.
> The flood plain was level like a roof.
> (George 2003, 710–713, XI: 133–136)

Regarding the source of the raw clay used by the deities, the Apsû (Sumerian **zu.ab**, Akkadian *apsû*) is often mentioned, as in the myth *Enki and Ninmah* quoted above. A Babylonian fire incantation mentions that the god Ea took clay from the Apsû:

> Ea, mankind was created by your spell, for the second time you removed a chunk of their clay[11] from the 'sky' of the Apsû (Lambert 1970, 43, lines 25–26 with Lambert 2000, 76).

Furthermore, the first-millennium ritual for the reconstruction of a collapsed temple wall *Enūma Anu ibnû šamê* contains a short presentation of Ea's creation of humankind. For the construction of his temple in Apsû, Ea first removed a chunk of clay from the Apsû. Then he created the brick god Kulla, who is not only responsible for the manufacture of mudbricks, but also for the construction of the building itself. Ea fashioned the necessary building materials reed and wood, and the artisan gods responsible for the processing of the raw materials. Once the regular sacrifices for the gods were guaranteed, Ea created the king and humankind as carers of the gods (Ambos 2004, 180–183).

[9] Translated as "she took a pinch of clay" (*ṭiṭṭa iktariṣ*) by George, but see footnote 7.
[10] For other references to clay used in a similar context, see CAD Ṭ, 108–109 (under *ṭīdu* c).
[11] Lambert translated "nipped off." This action by Ea, however, should be understood as removing a chunk of clay rather than 'nipping off' (see footnote 7 above).

The Apsû is generally considered as the cosmic water beneath the earth (the subterranean ocean) on which springs draw.[12] It is an essentially humid environment. The earliest occurrence of the name goes back to as early as Uruk IV–III levels in the lexical list of 'Cities.'[13] The god Apsû is a primeval male deity who appears at the very beginning of the creation myth, *Enūma eliš*, as one of the prime pairs. In the myth, Apsû mingles water with Tiāmat ('sea') to create the first-generation deities such as Lahmu, Lahamu, Anshar, and Kishar (Lambert 2013, 50–51, I: 3–20). Later, Apsû was killed by Enki/Ea, the son of Anu and grandson of Anshar and Kishar. This episode explains why Enki/Ea took up his residence in the Apsû, the subterranean water. Apsû is also mentioned as the name of a cultic installation in temples (Lambert 2013, 217). Clay is thus not just a common raw material but was seen — with its mythological background — to be associated with magical qualities.

3.2. Clay figurines in ritual contexts

For people living in Mesopotamia, clay was one of the most important raw materials, not only for the manufacture of mudbricks and tablets, but also in ritual contexts. More than any other genre, ritual texts refer to specific sources of raw clay. For the performance of certain rituals, the *āšipu* or 'exorcist' made use of magical figurines. These figurines could be made of various materials, including different kinds of clay. In anti-witchcraft rituals, for example, clay figurines representing the warlock and witch play an important role; in other rituals the used figurines could be apotropaic. Most rituals simply call for figurines made of clay, using the generic designation IM = *ṭīdu/ṭiṭṭu*,[14] while others call for figurines made of clay from one or both banks of the river, a city ditch, a riverine meadow, or clay from a clay pit.[15] A river setting may have had symbolic meaning, as, during the mouth-washing ritual (*Mīs pî*), anthropomorphic cult statues were ritually purified at the riverbank "for their severance from human crafting or agency, and for the establishment of their divine origins or antecedents" (Sonik 2015, 171 with references). Sometimes the clay for the figurines is mixed with other substances, such as tallow or bitumen.[16]

When clay from a clay pit was needed in magical contexts, special rituals were performed to consecrate and purify the clay pit. In the present article, *purification* does not refer to the refining of the clay by the removal of coarse material via sieving, winnowing, settling and levigation, but to the ritual purification of the clay by a Mesopotamian *āšipu*. This process is described in ritual procedures that require clay for the creation of magical figurines "as an unadulterated original

[12] For a study of Apsû, see Lambert 2000, 75–77; Lambert 2013, 217–218.

[13] Lines 33 and 60 (Englund and Nissen 1993, 147, 149, 285). Cf. Lambert 2000, 75.

[14] This generic clay could be used along with clay from the riverbanks (CMAwR 1, text 8.3, 1: 107–108: "Four figurines of clay, four figurines of clay from both banks of the river").

[15] All examples listed here are derived from the anti-witchcraft corpus (though examples from other kinds of texts could also be given). In some of these passages the clay is taken by the exorcist; at other times, however, a witch is accused of having used clay from the specified source to make figurines of the patient. River clay was used in: CMAwR 1, text 7.8, 5: 3, 14; text 8.3, 1: 107–108; text 8.7.1: 107‴; text 9.3: 4′–5′; CMAwR 2, text 7.25: 8; text 8.23, 1: 40′–42′, 48′; text 8.34: 3′–4′ (in this text the clay is extracted with an (iron) knife); CMAwR 3, text 3.15: 38″ (K 2417); *Maqlû* II: 183; *Maqlû* Ritual Tablet: 40′. Clay from a city ditch provided the raw material for a figurine in *Maqlû* II: 190; and clay from a riverine meadow was needed in CMAwR 2, text 8.37: 13′. For references to clay from a clay pit, see below with footnote 21.

[16] E.g., *Maqlû* Ritual Tablet: 40′ (tallow); CMAwR 1, text 8.7.1: 92″–93″; text 8.7.2: 8; CMAwR 2, text A.5: 22 (bitumen).

substance" (Postgate 1997, 212). With gifts such as precious metals and stones, the clay pit is paid a symbolic purchase price; the clay pit is thus propitiated and compensated for its subsequent depletion (George 2010, 277). Reciting incantations, the exorcist symbolically turns the clay into pure clay from the Apsû, the subterranean ocean and residence of the god Enki/Ea, enabling the exorcist to extract pure clay from the pit, clay suitable for the creation of magical figurines. The reference to the Apsû is not coincidental, as clay is repeatedly said to either come from the Apsû or to have been found over the Apsû (Horowitz 1998, 337; see also above).[17]

Some examples may illustrate this. On the third day of a ritual to block the entry of evil into someone's house, the exorcist went out to the clay pit to obtain clay for the creation of a whole array of magical figurines. After consecrating and purifying the pit with censer, torch and holy water, and throwing seven grains of silver, seven grains of gold, carnelian and *ḫulā*[*lu*-stone] into the pit as ritual purchase price, he set up a censer with juniper, poured a libation of beer, knelt down and stood up again and recited the incantation 'Clay pit! Clay pit (*kullat kullat*)!':[18]

> Clay pit! Clay pit!
> You are the clay pit of Anu and Enlil,
> the clay pit of Ea, lord of the deep,
> the clay pit of the great gods.
> You have made the lord for lordship, you have made the king for kingship,
> you have made the prince for future days.
> Your pieces of silver are given to you, you have received them;
> you have received your gift.
> Thus, in the morning before Shamash, I remove a chunk of clay of NN, son of NN.
> May it be profitable! May what I do prosper!
> (see Wiggermann 1992, 12–13, lines 151–157; Maul 1994, 47; Sallaberger 1996, 9)

A lengthy anti-witchcraft ritual records the clay-pit incantation '[Clay] pit ([*kull*]*atu*), you are the creator of god and man!' After mentioning the clay pit's payment, the incantation continues as follows:

> Since your water has no one who can resist it, your inside is wide, lead him away with your water, take him with your water, may he be sent off together with your water. Dismiss him from before you, turn him away from before you! Take him, so that he may be removed, be sent off! May he never again turn back, may he not reach me, not come near me, not approach me! (CMAwR 2, text 8.25: 19–22)

With this pure clay, the exorcist is to prepare figurines of Namtar, warlock and witch, and possibly also of 'Any Evil.' Interestingly, the clay pit is described as a body with flowing water, indicating

[17] Cf. the god Enki/Ea's instruction to his son Asalluhi to make figurines of a warlock and a sorceress, a man and a woman, out of clay from the subterranean ocean (CMAwR 2, text 7.12: 17–18). A special "mixture of clay from the Apsû, the place of extraction (of the clay)" is used to anoint the pedestal(?) of the brick god Kulla (Ambos 2004, 98–99, lines 8–10).

[18] For this ritual, see Wiggermann 1992. The same incantation was recited in a universal namburbi, see Maul 1994, 485–486, lines 19–21.

that it was located near a river or canal.[19] Good clay can be found in areas where water converges. Lexically, the clay deposit (*kullatu*) is equated with clay from a small canal or irrigation ditch (**im pa$_5$** = *ṭīd palgi*) (MSL 7, 113, ḪAR.gud: 133).[20]

Another frequently quoted example of a clay-pit incantation concerns the laying of a temple's foundation, necessitating the creation of a figurine of the divine vizier Papsukkal-Ninshubur and sixteen other figurines:

> When you lay the foundations of the house of a god, you will go to the clay pit three days before you lay the foundation. You will take lapis-lazuli, mix emmer beer with roast flour, and throw (all of this) into the clay pit. You will speak as follows: "Clay pit, receive your selling price! On the third day, I will make with your clay a figurine of Ninshubur!" After you have said this, you will prostrate yourself and go away. You will stand where you will lay the foundations of the house of a god and say as follows: "Lord, I will make your vizier!" (Ambos 2010, 232–233; Ambos 2004, 156–157, lines 1–9).

Three days later, the clay for Ninshubur's figurine is taken with a spade (*marru*; Ambos 2010, 233; Ambos 2004, 158–159, line 33), the figurine is formed, identified, and buried under the pedestal in the cella. Ritual instructions often necessitate magical figurines made with clay from a purified clay pit.[21]

Clay pits may also be mentioned in prescriptions and omens. The diagnosis of a prescription for a bewitched person suffering from potency problems reads as follows:

> that man's se[men] has been buried with a dead person, his penis has been sealed and shut up in a clay pit (*kullatu*) towards sunset (CMAwR 1, text 2.5, 4: 5–7).

In the forty-third excerpt of the omen series *Šumma ālu*, bathing in water in a clay pit (*essû*) is a positive omen, while bathing in a ditch or canal (PA$_5$) is negative (SpTU 2 34: 32, 34; see Farber 1989). The protasis of another omen from *Šumma ālu* says: "If flood is opaque like the water of a yellow clay pit (*essû*) and …" (Tablet 61: 44; Freedman 2017, 144). Tablet 60 of the same series deals with irregularities in nature. Part of the tablet concerns omens about plants seen in "clay pits" (TÚL.LÁ = *essû*); the omens differentiate between "clay pits of a city" (TÚL.LÁ URU) and "clay pits in an (open) area" (TÚL.LÁ KI; see Freedman 2017, 136–138). As von Soden (1992) demonstrated, when these clay pits are no longer exploited for brick manufacturing, trees and plants may start to grow in them.

3.3. Mudbricks

The Mesopotamian soils were generally well-suited for building projects, providing "a very acceptable substitute for stone as a building material when moulded and exposed to the intense summer

[19] Compare with the River incantation in CMAwR 2, text 11.3, 1: 21–25.

[20] See MSL 7, 113, lines 131–134 — this list further includes wall plaster (*šallaru* or *sīru*), a lump of clay (*kirbānu*), river silt (*qadû šikani* or *šiknu ša nāri*) and clay (*qadūtum* or *ṭīdu*).

[21] E.g., CMAwR 1, text 2.2, 1: 41″–46″; text 7.6.6: 35–36, 9*–11*; text 8.10: 6–7; text 8.7.1: 92″–93″; text 8.7.2: text 8, 22–23; CMAwR 2, text 8.26: 2–5; text A.5: 4–5, 22; *Maqlû* III: 17; SpTU 2 21: r. 11′–14′; SpTU 3 84: r. 28. In SpTU 3 84: r. 28, the exorcist is to purify clay from a pond or cistern (PÚ) and clay from a clay pit (KI.GAR) for the manufacture of a figurine.

heat of the plain (it can reach 50 °C in Babylonia in the shade) for an appropriate length of time, or better still when kiln-fired" (Moorey 1999, 302). The choice of clay or soil used to make the bricks determines their future quality. As a rule, the soil was taken near the place of construction. As Sauvage demonstrates, there is evidence of more selective practices. In Kish, for example, it seems that clay from the open country was preferred to clay from the river, because the clay from the open country needs no tempering, while river clay needs to be tempered with sand (Sauvage 1998, 18). Economic motives often led to the construction of buildings with some good quality bricks, but also with more fragile bricks made of local earth from excavations (Sauvage 1998, 18 with fn. 7).

Both pit extraction and surface collection were employed in building works. However, textual sources mentioning the origin of the clay that was used for bricks are scarce. Several Mesopotamian rulers prided themselves on making and laying the first brick of temples, or, as in the case of Gudea, the "fated brick" (**sig$_4$-nam-tar-ra**). Gudea was a ruler of the second dynasty of Lagash. Proudly, he described his work on Ningirsu's rebuilt temple Eninnu, involving the manufacture of the temple's fated brick. To locate the right raw material for the temple's bricks and thus the proper clay pit, the ruler had an extispicy (i.e., an inspection of the entrails of a sacrificial animal for the purpose of divination) performed, after which he let the god's standard shine at the pit.[22] The fashioning of this special brick is further recounted as follows:

> As for the clay pit (**ka-al**), he uncovered the top for the brick (to be made). He hoed in syrup, butter, and cream, mixed ambergris and essences from all kinds of trees into a paste. He raised the brand-new carrying-basket and set it before the mould. Gudea put the clay in the mould, acted precisely as prescribed, and he succeeded in making a most beautiful brick for the House (Gudea Cylinder A: xviii 19–26, translation by Edzard 1997, 80).[23]

Another type of clay, this time sourced at a canal, was used as plaster:

> The clay (plaster) of Eninnu, artfully applied, (after having been) brought up from the Steppe Canal (**íd-eden-ta**), did its master, the lord Ningirsu (himself), conceive of in his pure heart; he poured it over its top like eyepaint (Gudea Cylinder A: xxvii 20–24, translation by Edzard 1997, 86).

The building work on Gudea's temple thus required clay from a clay pit that was pure (by extispicy) for the manufacture of bricks, and clay from a steppe canal for plaster.

If clay for mudbricks was extracted from a clay pit that had received a symbolic purchase price for its ritual purification, it was possible that brickmakers encountered some *materia magica* when filling the clay into the brickmoulds. The very fragmentary third tablet of *Šumma ālu* seems to deal with this situation (see Ambos 2004, 67).

According to a late apocryphal tradition, Sargon of Akkade "took earth away from the clay pit (*eper essê*) of Babylon and built, near Akkade, a replica of Babylon" (Glassner 2004, 270–

[22] See also Pongratz-Leisten 2009, 421–422, discussing Gudea Statue C: ii 20–iii 5. Note that iii 1–5 read as follows: "Its clay he mixed at a place (declared to be) pure (by extispicy). Its brick he formed at a purified place" (translation by Pongratz-Leisten). The clay pit was thus "pure (by extispicy)."

[23] Cf. "I mixed its clay with honey, fine oil, cedar resin, beer (and) wine" (Shalmaneser III: RIMA 3, A.0.102.10: iv 52–53).

271, lines 18–19; discussion p. 87). This sacrilegious act would have brought the rage of the god Marduk upon this ancient king. At the time the *Chronicle* was written, the account served as a warning not to do likewise or risk the god's anger.

The methods used to make bricks in ancient Mesopotamia are still employed today.[24] Generally, chunks of clay were removed from a clay pit or the banks of a waterway and carried in a basket to the place where mudbricks (**sig$_4$**/*libittu*) were made. Early foundation deposits in the shape of a man carrying a basket of earth on his head depict the king carrying clay from the clay pit to the brickmould (Fig. 3).[25] First-millennium stelae represent the kings Ashurbanipal (Fig. 4) and Shamash-shumu-ukin in the same posture.[26]

But whereas the kings only created and laid the 'fated' or first brick, their extensive building projects needed many labourers to hoe out the raw clay and bring it to the site where the bricks were made. 'Taking up hoe and basket' and 'making bricks' were works often imposed on people subjugated by the Mesopotamian rulers.[27] The mass production of mudbricks made from this clayey soil generally took place in the third month of the year (May–June) after the spring rains, when the soil of the clay pits would have been moist and the bricks would have the whole summer to dry.[28]

3.4. Pottery

In *Der babylonische Töpfer und seine Gefässe*, Sallaberger (1996) investigated potters and pottery, using primarily textual, but also material evidence, from the Early Dynastic III to Old Babylonian periods, providing us with a wealth of information about ceramic production in the ancient Near East. The Mesopotamian potter mainly produced fired ceramic vessels, but also ovens and mortars of clay; he did not make bricks or magical figurines. Using anthropological, archaeological, and textual data, Sallaberger reconstructed the potter's activities. Unfortunately, the cuneiform records do not provide us with information as to the source of the potter's clay. In *Mesopotamian Civilization: The Material Foundations*, Potts states that "All of the clay used in antiquity for local pottery manufacture was the calcium-rich, montmorillonite clay (Jacobs 1992, 132) deposited by the Tigris and Euphrates in the course of periodic flooding" (Potts 1997, 138). David Kanikanian, a potter from a family of potters in Mosul, once told Christopher Walker that they used to extract fresh clay from the flood plain between the Tigris and the walls of Nineveh when the floodwaters receded in spring; this clay was "ready for the wheel" (Reade 2017, 170).

As can be deduced from a few literary sources and an administrative document, the retrieval of raw clay for pottery was also in antiquity part of the potter's work. In the Sumerian creation myth, the *Debate between Winter and Summer*, digging up clay (**im ba-al**) is listed as one of the chores of the potter (line 210; PSD B, 47); his work is characterized as summer work, ideally carried out when the high waters of the rivers have receded and the deposited clay can be collected easily. In *Inana and the numun-plant*, the potter breaks off the clay he needs to make a vessel (**báḫar-e dug-**

[24] Both Salonen (1972) and Sauvage (1998) refer to Iranian practices as discussed by Wulff (1966).
[25] See, e.g., Suter 2000, 53 fig. 6, 61, and the illustrated canephore figurines in Ellis 1968, figs. 19–20, 22–25.
[26] See, e.g., Ellis 1968, fig. 26.
[27] E.g., RINAP 3/1, text 1: 71; RINAP 4, text 2: iv 44–46.
[28] See Ellis 1968, 17–18; Salonen 1972, 10; Lambert 1987, 204; Sauvage 1998, 17; Ambos 2004, 22. For more information on the manufacture of mudbricks, plasters and mortars, see Ellis 1968, 17–31; Salonen 1972; Moorey 1999, 302–332; and Sauvage 1998, 17–26.

Fig. 3: Rim-Sîn foundation figurine (1822–1763 BC). Courtesy of the Oriental Institute of the University of Chicago

Fig. 4: Stone stela of Ashurbanipal; the king is shown with a ritual basket of earth on his head as a royal builder for the accession of Shamash-shumu-ukin and the restoration of Esagila in Babylon, 668–655 BC, from the Marduk Temple, Babylon. Courtesy of the Trustees of the British Museum (photograph taken by C. E. Watanabe)

sìla àm-kìr-kìr, line 51; PSD B, 47). In a list of personnel from the Ur III Inanna temple in Nippur, a potter is employed in the clay pit of the god Ishkur (**báḫar eššeb ^{d}iškur**; Zettler 1992, 157; see also Sallaberger 1996, 13). Once the clay was obtained, the potter had to prepare it for ceramic objects by removing coarse particles, grinding the clay and possibly adding temper; the shaping and forming of the clay into pottery and the subsequent firing of the vessels in a kiln were also their responsibility (see Sallaberger 1996, 7–18; and Barrelet 1968, 5–51). Sallaberger and Barrelet discuss the Sumerian and Akkadian vocabulary related to potters and ceramic manufacture. See also the summary articles on potters (“Töpfer”) and clay (“Ton”) by Sallaberger (2014–16a and b).

3.5. Clay tablets

Information about the manufacture of clay tablets, and especially the source of raw clay, is rare. However, where to find good tablet clay and how to make proper tablets must have been part of scribal training. Reade (2017, 170) argues that “doubtless [the scribes] had their own favourite sources, and probably had different grades of clay or blank tablet at hand, perhaps all taken from a single source but cleaned with varying degrees of thoroughness.” The general appearance of various types of clay used for tablets is summarised in his discussion of tablet clay sources (Reade

2017, 169–172). The quality of the clay used for tablets varied according to place, genre, and other factors (Taylor 2011, 7). The scribes could use fresh clay from riverbanks and canals, or "ancient alluvial material, taken from deep clay pits or from exposed or recently eroded geological strata that were accessible throughout the year" (Reade 2017, 170). Taylor and Cartwright refer to experiments performed by Starr (1939, 443) which proved that highly purified clay, without any visible quantity of sand, "could be obtained by allowing the water to seep or evaporate away from a wet mixture of common clay. The same effect could be observed in every dried-up puddle after a rain-storm. This raises the possibility of not even having to travel to a river, canal or pit to obtain suitable clay" (Taylor and Cartwright 2011, 318 fn. 100). Presumably, with the omnipresence of good clayey soil, there was no need to transport raw clay from more distant areas nor to extensively reuse the clay from unbaked clay tablets.

Most cuneiform tablets give no information about the source of their clay. Remarkably, in their colophons, a small group of school tablets destined for the temple gives us an account of a special day in the life of young scribal pupils. The most telling example reads as follows:

> For Nabû, … my lord, I, Shamash-rihtu-uṣur, son of PN, the baker of Shamash and Aya, with joy in my heart went out to the open countryside. I picked up some clean clay and brought it from the holy clay-deposit (*kullatu qadištu*). I loaded(!) it on my shoulder and transported it. For my good health, for a long life, for well-being, for the well-being of my father's household, my own stability and my successful raising(!) of a family, I(!) sent it in to the *gunnu*-container, to the porter of the door of the E-babbarra. O tablet, when you enter, [intercede(?)] for Shamash-rihtu-uṣur, son [of PN …] (MS 5007, edited and discussed in George 2010).

The tablet's many errors and erasures show that it is the work of a beginner. This kind of tablet, sometimes known as a 'tablet of childhood,' "may have formally marked the boy's completion of an initial stage of his education" (George 2010, 277). On the big day, at dawn, an exorcist (and a teacher, if the exorcist was not the teacher) took the young boy (and probably his fellow pupils) to a clay pit outside the town that had been ritually purified with gifts and incantations as in the examples shown above. There, the young boys extracted a chunk of raw clay from the clay deposit, carried it, and wrote a tablet to be dedicated to the Shamash temple at Sippar. We may picture the boys with a child's-sized basket on their backs proudly bringing clay back to town, possibly for the first time in their scribal career.[29] With part of the clay, Shamash-rihtu-uṣur wrote this tablet (see George 2010). One of the other school texts refers to a "chunk of clay from the Garden of the Apsû," which was "a sacred location at Babylon, on the east bank of the Euphrates next to the temple of Ea in the center of Babylon" (George 2010, 277).

Having to carry the raw clay on his back, the chunk of clay was clearly bigger than needed to make this 'tablet of childhood.' What happened to the rest of the chunk? Did the boys take the clay to the temple or to their place of learning, where it was collected in a container for tablet

[29] Cf. a relief from the South-West Palace of Sennacherib at Nineveh shows some artisans hewing out a big limestone block at Balaṭaya in preparation for the creation of a bull colossus. Other hostages or slaves carry the debris away in baskets on their back (Layard 1853, plate 14). Some of the workers are chained. On plate 15, a path is cleared to bring the bull colossus from its extraction place to the river; here, too, workers carry the soil away in baskets on their backs (slabs 66–68, see Barnett et al. 1998, vol. I, 68 under nos. 156–158).

clay? The cuneiform sources do not answer this question. Scribal quarters may well have had clay-preparation areas with bins or containers for the storage of raw tablet material (see Meijer 2004).

A Late Babylonian ritual gives instructions for the preparation of apotropaic clay amulets:

> Its [rit]ual: You take clay from a canal; you mix (it) with water from the canal. You make a cylinder seal (and) w[rite] this incantation on (it). […].
> (CMAwR 3, text 6.2 [BM 49141+]: 5′)

On the different ways to make clay tablets, see for example Taylor 2011, 11–12; and Taylor and Cartwright 2011, 299–300.

4. Archaeological data on clay pits

Archaeological investigations have revealed possible clay pits in Mesopotamia. Potential clay pits could be the same pits that have been identified as mudbrick extraction pits (e.g., Wilkinson et al. 2001; Pustovoytov et al. 2011). These pits are evident in field surveys or imagery showing sunken areas near settlements. So-called mudbrick extraction pits have been located in northern Mesopotamia in particular. However, in southern Mesopotamia, similar pits are evident on satellite imagery, such as Tell al-Wilaya (Hussein et al. 2009). Similar to the northern Mesopotamian cases, these pits are seen as something akin to ditches or surface depressions near the main settlement mounds. One cannot know if these pits or seemingly ancient excavations are the same as the clay pits mentioned in texts; however, the features' closeness to archaeological sites suggests places where people could have reasonably gone and extracted clay for mudbricks or tablets. Different levels within these pits could provide different levels of clay quality. Despite these observations and suggestions for these landscape features serving as possible clay pits, direct and systematic archaeological investigations of these features have mostly not been undertaken.

5. Conclusion

Clay was used extensively as the raw material for daily commodities in Mesopotamia. It has not been systematically investigated, however, as to how and where raw clay was sought and collected to make various objects. In this article, we investigated the sources of the raw clay used for the manufacture of mudbricks, pottery, magical figurines and clay tablets in ancient Mesopotamia from a textual point of view. The cuneiform record has little to say on the matter of the source of raw clay, which may be no surprise as clay is abundantly available in the Land of the Twin Rivers and working with clay a common chore long before writing was invented. Nevertheless, it is clear that the people working with clay — the brickmakers, potters, scribes and exorcists — selected the raw clay according to their needs, be it clay from clay pits or clay extracted from the surface. In myths, clay was associated with Apsû, the subterranean water, and the god Enki/Ea who resides in Apsû; this association provides the clay with a mythological background and magical properties. Such aspects are well reflected in the manufacturing process of clay figurines used in rituals. Ritual texts in particular identify the origin of the raw clay for specific purposes. It might be specified that magical clay figurines could be made with clay from a clay pit only after that pit had been purified

with gifts and incantations, but the ritual texts might just as well instruct the exorcist to use clay from the riverside or another wet location. Raw material for making mudbricks was supplied by both pit extraction and surface collection. For a temple building, Gudea recorded that clay from a clay pit was used for manufacturing bricks, and clay from a steppe canal was used for plaster. In pottery making, clay was taken by potters in the summer after the high water of the river receded leaving clay deposits. For manufacturing clay tablets, one text mentions the collection of clay from a clay deposit in open countryside. Whether out-of-town clay pits or river sediments were the standard source of tablet clay remains a question unanswerable by referring to the known written sources. Archaeological surveys revealed possible extraction pits in the form of sunken areas.

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Abbreviations follow M. P. Streck (ed.), *Reallexikon der Assyriologie und Vorderasiatischen Archäologie* 14, Berlin, 2014–16, iii–lv, with the following additions: CMAwR 1 = Abusch and Schwemer 2011; CMAwR 2 = Abusch et al. 2016; CMAwR 3 = Abusch et al. forthcoming; *Maqlû* = Abusch 2015; RIMA 3 = Grayson 1996; RINAP 3/1 = Grayson and Novotny 2012; RINAP 4 = Leichty 2011.

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